

Castine Golf Club

Site Assessment and Environmental Plan

Audubon Cooperative Sanctuary Program for Golf Courses
Audubon International



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Prepared by:
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September, 2012

Background:

The Town of Castine's Pesticide Committee has questioned the Turf Management and IPM practices of the Club. The Club has made a board level commitment to enter the Audubon ACSP Program after taking legal advice and discussing the matter with the Town Selectman.¹

According to the Audubon application, the Castine Golf Club goals are to:

- Develop a wildlife, plant and community friendly golf course.
- Maintain and further develop the links style of the course based on the heritage of the town and of the course designer, Willie Park, Jr.
- Improve the aesthetics and overall appearance of the grounds.
- Adhere to State and Local Guidelines regarding pesticide use.

To meet the requirements of the Audubon Program we must:

- Create a map and a natural resource inventory of the golf course.
- Recommend native plantings for the pond, aside fairways, within wildlife corridors and at a butterfly/native flower garden.
- Identify areas of exotic plants that need removal.
- Show places for bird boxes and brush piles.
- Design a nature trail.

All these have been done, and are included on the following pages. This will meet the following requirements for site assessment and planning, documentation, wildlife habitat and management, water quality management and education from the Site Assessment and Environmental Plan:

Supplemental Structures for Wildlife

Shelter

Bluebirds/Swallow nest boxes

Wrens/Chickadee nest boxes

Brush piles

Outreach & Education

Butterfly/Hummingbird/Display Garden(s)

Nature Trail(s)

Educational Sign(s)

Wildlife and Habitat Management

Map illustrating natural areas and buffers

Identify core habitats (woodlands, wetlands, special habitat concerns)

Identify dominant native plant community and ecological region in which the golf course is located.

Maintain inventory of bird and mammal species, additional inventories may include amphibians, trees, shrubs and herbaceous plants.

Connect wildlife habitat areas to others insides and outside property boundaries with corridors of natural vegetation.

Maintain/plant varying heights and types of plants from ground cover to shrub and tree layers in habitat areas such as woods.

Leave dead trees standing when not a safety hazard.

¹ Pg. 12 Audubon ACSP application

Maintain a water source for wildlife with aquatic and native plants.
Naturalize at least 50% of out-of-play shorelines.
Choose flowers for gardens that provide nectar for hummingbirds or butterflies.

Maintain nesting boxes.

Protect wildlife habitats through buffers or mounted signs.

Establish at least 80% of the landscaped trees, shrubs and flowers with native plants.

Purchase landscape plants from locally-grown sources whenever possible.

Avoid removing shrubs or trees or mowing fields during nesting season.

Restore areas overrun with invasive exotic species.

Select plant species best suited for our climate.

Water Quality Management

Eliminate erosion to streams and ponds.

Employ environmentally-sensitive plant management within 25 feet of water bodies.

Outreach and Education

Invite community members to help with at least two of the following:

- Monitor nest boxes.

- Help with wildlife gardens.

- Ecological restoration projects.

- Maintain/using nature trails.

- Host wildlife walks on or around golf course.

Water Quality:

The following three maps show wells, aquifers, reservoirs, steep slope contours, and soils at the Castine Golf Course. The maps illustrate why it is important that the Castine Golf Course continue to use best management practices concerning the use of chemicals and increase the use of natural revegetation to prevent the pollution of drinking water supplies.

As can be seen on the maps, the Golf Course sits at the highest elevation in the area and is surrounded by steep slopes that drain into the drinking water supplies to the north, west and east. There is little to absorb stormwater from the golf course because the land is situated on top of highly permeable glacial till overlaid by Colton and Kinsmen soils. Colton soils are strongly sloping, excessively drained on the sides of outwash plains and eskers. Permeability is very rapid and erosion control measures are needed.² Kinsmen soils are poorly drained soils in depressions on outwash plains. Permeability is also rapid and because of the high water table they are considered poorly suited for urban uses.³

² Soil Survey of Hancock County Area, Maine. USDA, 1998.

³ Ibid.

Drinking Water Supplies Surrounding Golf Course



Legend

- ◆ Public Wells
- 300ft. Well Buffers
- Reservoir
- Aquifer
- Castine Golf Course

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⁴ <http://www.maine.gov/megis/catalog/>

Steep Slopes, Castine Golf Course



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Legend

 Castine Golf Course

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⁵ <http://www.maine.gov/megis/catalog/>

Soil Map, Castine Golf Course



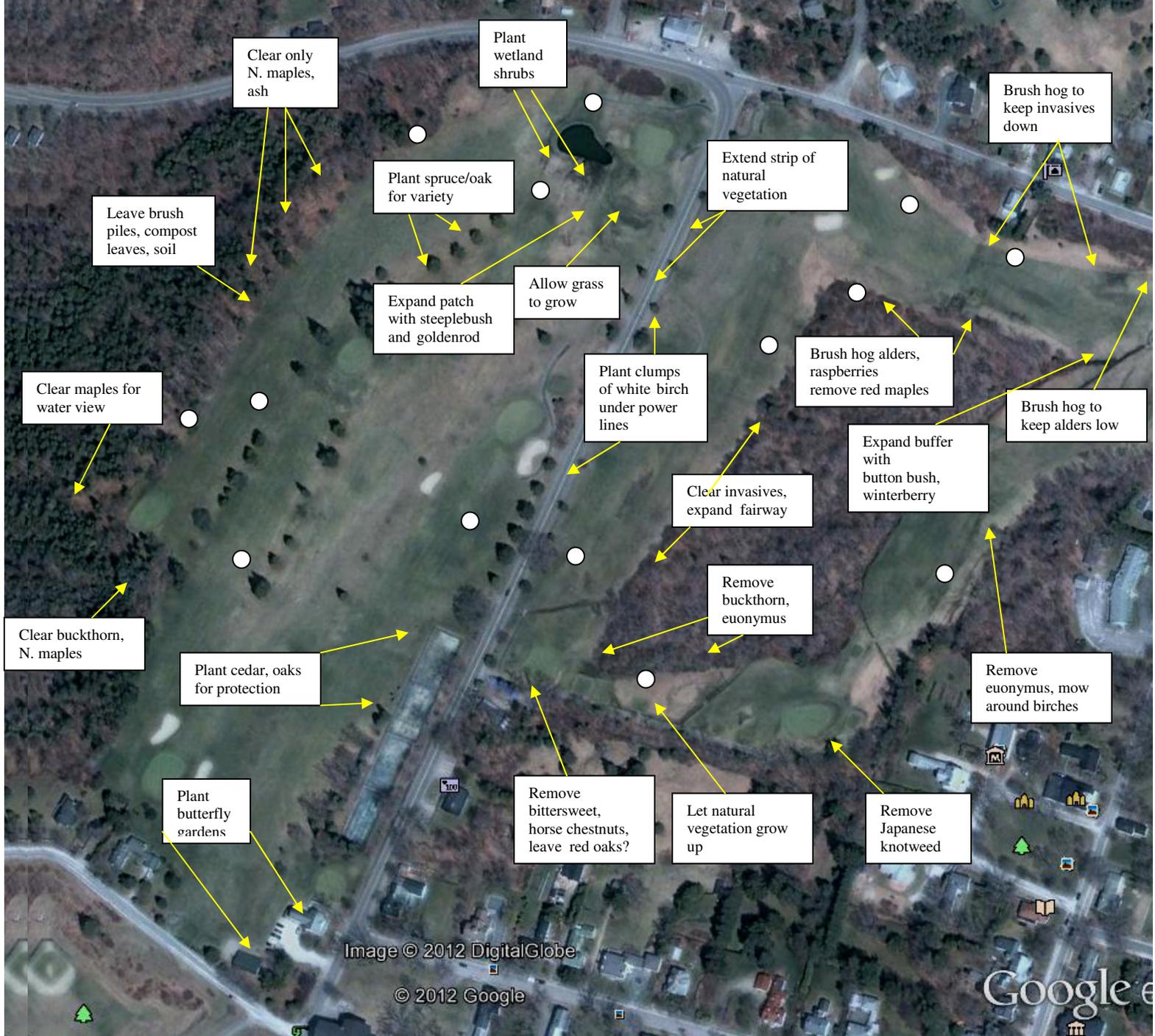
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Legend

- Castine Golf Course
- Public Wells
- Aquifer
- 300ft. Well Buffers
- Soils:
 - CoC--Colton Gravelly Sandy Loam
 - Kn-- Kinsmen Loamy Sand

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⁶ <http://www.maine.gov/megis/catalog/>



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See description of recommendations on pgs. 18-23

○- Existing and proposed birdhouse locations

All birdhouses should have raccoon guards at entrance hole or pvc piping on posts.

Possible Hiking Trails, Castine Golf Course



Legend

-  Castine Golf Course
-  Trail Entrances

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Map of Natural Areas, Woodland and Wetland Habitats and Plant Communities



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Observed Plant and Wildlife Inventory, Castine, Maine

Trees:

Abies balsamea (balsam fir)
Acer pensylvanicum (moosewood)
Acer rubrum (red maple)
Acer saccharum (sugar maple)
Betula alleghaniensis (yellow birch)
Betula papyrifera (white birch)
Cercis canadensis (red bud)
Fagus grandifolia (American beech)
Fraxinus americana (white ash)
Larix laricina (larch)
Picea glauca (white spruce)
Picea rubens (red spruce)
Pinus strobus (white pine)
Populus tremuloides (quaking aspen)
Prunus serotina (black cherry)
Prunus virginiana (choke cherry)
Pyrus Malus (apple)
Quercus rubra (red oak)
Sorbus americana (mountain ash)
Thuja occidentalis (northern white cedar)

Shrubs:

Alnus rugosa (speckled alder)
Cornus alternifolia (alternate leaf dogwood)
Cornus canadensis (bunchberry)
Cornus oblique (silky dogwood)
Cornus racemosa (gray stemmed dogwood)
Gaultheria procumbens (wintergreen)
Ilex verticillata (winterberry)
Spiraea alba (meadowsweet)
Vaccinium angustifolium (low bush blueberry)
Viburnum acerifolium (maple leaf viburnum)

Vines:

Mitchella repens (partridge berry)
Parthenocissus quinquefolia (Virginia creeper)
Toxicodendron radicans (poison ivy)

Herbs:

Achillea millefolium (yarrow)
Actaea pachypoda (white baneberry)
Alopecurus spp. (foxtail grass)
Asclepias syriaca (common milkweed)
Aster novae-angliae (New England aster)
Daucus carota (Queen Anne's lace)
Eutrochium purpureum (Joe Pye weed)
Hieracium aurantiacum (orange hawkweed)
Hieracium lachenalii (hawkweed)
Hypericum perforatum (common St. Johnswort)

Impatiens capensis (orange jewelweed)
Potentilla simplex (common cinquefoil)
Solidago Canadensis (Canada goldenrod)
Spiraea alba (meadowsweet)
Spiraea tomentosa (steeple bush)
Trifolium arvense (rabbit-foot clover)
Trifolium aureum (hop clover)

Grasses:

Poa annua (annual bluegrass)
Schizachyrium scoparium (little bluestem)
Setaria italica (fox-tail bristle grass)

Ferns and allies:

Athyrium filix-femina (lady fern)
Dennstaedtia punctilobula (hay-scented fern)
Onoclea sensibilis (sensitive fern)
Osmunda cinnamomea (cinnamon fern)
Osmunda claytoniana (interrupted fern)
Pteridium aquilinum (bracken fern)

Mammals-expected to be observed:

Tamias striatus (eastern chipmunk)
Sciurus carolinensis (gray squirrel)
Tamiasciurus hudsonicus (red squirrel)
Peromyscus leucopus (white-footed mouse)
Procyon lotor (raccoon)
Odocoileus virginianus (white-tailed deer)
Vulpes vulpes (red fox)

Birds-expected to be observed: (Maine Breeding Bird Survey)⁷ and personal observations

Branta Canadensis (Canada goose)
Anas platyrhynchos (mallard)
Anas rubripes (black duck)
Aix sponsa (wood duck)
Mergus merganser (common merganser)
Bonasa umbellus (ruffed grouse)
Charadrius vociferous (killdeer)
Philohela minor (American woodcock)
Actitis macularia (spotted sandpiper)
Meleagris gallopavo (wild turkey)
Gavia immer (common loon)-observed
Cepphus grille (black guillemot) -observed
Phalacrocorax auritus (double-crested)
Ardea Herodias (great blue heron) -observed
Charadrius vociferous (killdeer)
Pandion haliaetus (osprey) -observed
Haliaeetus leucocephalus (bald eagle) -observed
Circus syaneus (northern harrier)
Accipiter striatus (sharp-shinned hawk)
Buteo platypterus (broad-winged hawk)
Buteo jamaicensis (red-tailed hawk)
Falco columbarius (merlin) -observed

⁷ <http://windowsonmaine.library.umaine.edu/fullrecord.aspx?objectId=7-308>

Falco sparverius (American kestrel)-observed
Larus argentatus (herring gull) -observed
Bubo virginianus (great horned owl)
Strix varia (barred owl)
Chaeitura pelagica (chimney swift)
Archilochus colubris (ruby-throated hummingbird)
Megaceryle alcyon (belted kingfisher)
Sphyrapicus varius (yellow-bellied sapsucker)
Colaptes auratus (yellow-shafted flicker)
Picoides pubescens (downy woodpecker)
Picoides villosus (hairy woodpecker)
Contous virens (eastern wood peewee)
Sayornis phoebe (eastern phoebe)
Tachycineta bicolor (tree swallow) -observed
Hirundo rustica (barn swallow)
Corvus brachyrhynchos (American crow) -observed
Coruvs corax (common raven)
Cyanocitta cristata (blue jay)
Parus atricapillus (black-capped chickadee) -observed
Sitta canadensis (red-breasted nuthatch) -observed
Troglodytes troglodytes (winter wren)
Dumetella carolinensis (gray catbird)
Turdus migratorius (American robin)
Sialia sialis (eastern bluebird)
Catharus guttatus (hermit thrush)
Hylocichla mustelina (wood thrush)
Catharus fuscescens (veery)
Bombycilla cedrorum (cedar waxwing)
Vireo solitarius (blue headed vireo)
Vireo olivaceus (red-eyed vireo)
Dendroica virens (black-throated green warbler)
Dendroica fusca (blackburnian warbler)
Mniotilta varia (black and white warbler)
Vermivora ruficapilla (Nashville warbler)
Parula Americana (northern parula)
Wilsonia canadensis (Canada warbler)
Setophaga ruticilla (American redstart)
Dendroica coronata (yellow-rumped warbler)
Dendroica pensylvanica (chestnut-sided warbler)
Dendroica petechia (yellow warbler)
Geothlypis trichas (common yellowthroat)
Seiurus aurocapillus (ovenbird)
Seiurus noveboracensis (northern waterthrush)
Sturnus vulgaris (European starling)
Agelaius phoeniceus (red-winged blackbird)
Quiscalus quiscula (common grackle)
Junco hyemalis (slate-colored junco)
Pheucticus ludovicianus (rose-breasted grosbeak)
Zonotrichia albicollis (white-throated sparrow) -observed
Spizella passerina (chipping sparrow)
Melospiza melodia (song sparrow)
Cardeulis tristis (American goldfinch) -observed
Carpodacus purpureus (purple finch)

Recommended List of Plants Native to South-Central Maine⁸

Shrubs/understory trees				
(wettest to drier soil)	Wet soil	Drier soil	Shade	Food
	buttonbush		ok	
	speckled alder		no	yes
	red osier		ok	
	winterberry		ok	
	nannyberry		yes	yes
	arrowwood		ok	yes
	blueberry	yes	ok	yes
	alt leaf dgwd		ok	
	cranberry		ok	
	serviceberry	yes	ok	yes
	chokeberry		ok	
	mtn maple		ok	
	striped maple		yes	
	choke cherry		no	yes
		elderberry		yes
		witch hazel	ok	
		bayberry	no	
		grey dogwood	ok	yes
		blueberry		yes
		mtn ash	no	yes
		shrubby cinquefoil	no	
		sweet fern		no
Trees (wettest to drier)				
Wet tolerant				yes
green ash			yes	
red maple			yes	
larch			no	
black spruce				
Intermediate				
red spruce			yes	
balsam fir			no	
northern white cedar				
white spruce			medium	
yellow birch			medium	
white birch			no	
sugar maple			yes	
beech			yes	yes
Wet intolerant				
Norway spruce			medium	yes
red oak			med-no	yes

⁸ [Native Plant Recommendations - University of Maine,](http://www.umext.maine.edu/onlinepubs/htmlpubs/nativeplants.htm)
www.umext.maine.edu/onlinepubs/htmlpubs/nativeplants.htm
 and personal observations

white pine			med-no	yes
Groundcover				
bunchberry		ok	no	yes
partridge berry		yes	no	yes
bearberry		yes	no	yes
low bush blueberry		ok	medium	yes
Virginia creeper				yes
Ferns	Wet soil	Dry soil ok?	Sun ok?	
	ostrich			
	sensitive		yes	
	cinnamon		yes	
	lady			
		bracken	yes	
		interrupted	yes	
		Christmas	yes	
		hay scented	yes	
Flowers				
monarda, coneflower, black eyed susan, asters, Joe-pye, meadowsweet, jewelweed, pokeweed, milkweeds (common, swamp & orange)stepplebush,(moist soil only), blue flag (wet soil only),				

Local Nurseries Carrying Maine Native Plants

The Green Thumb T,S,V,P,F	RR 17, PO Box 22, West Rockport, Maine 04865		594-5070
Sprague's Nursery T,S,V,P,F	1664 Union Street, Bangor, Maine 04401	info@spraguesnursery.com; www.spraguesnursery.com	942-1394
Surry Gardens* T,S,V,P,F	PO Box 145, Surry, Maine 04684	surrygardens@downeast.net; www.surrygardens.com	667-4493
Fieldstone Gardens, Inc* T,S,V,P,F	55 Quaker Lane, Vassalboro, Maine 04989	info@fieldstonegardens.com; www.fieldstonegardens.com	923-3836
Hidden Gardens* S,P,F	96 Seekins Road, Searsport, Maine 04974		548-2864
Hoboken Gardens, Inc T,S,V,P,F	310 Commercial Street, Rockport, Maine 04856	askus@hobokengardens.com; www.hobokengardens.com	236-3023
Mainescape Garden Shop T,S,V,P,F	PO Box 356, 48 South Street, Blue Hill, Maine 04614	mainescape@mainescape.com; www.mainescape.com>	374- 2833, 800-244- 2833
NewLand Nursery and Landscaping* T,S,V,P,F	PO Box 1133, 124 Bangor Road, Ellsworth, Maine 04605	newlandnursery@roadrunner.com; www.newlandnursery.com	667-7333
D.R. Struck Landscape Nursery T,S,V,P,F	Route 202, Box 2215, Winthrop, Maine 04364	drstruck@fairpoint.net	395- 41122
Windswept Gardens, LLC T,S,V,P,F	1709 Broadway, Bangor, Maine 04401	bob@windsweptgardens.com; www.windsweptgardens.com	941-9898

About the author:

Jim Nordgren is an environmental consultant living in South Salem, NY. He has written natural resource inventories, management plans and open space plans for the Westchester Land Trust, the John Jay Homestead Historical Site, the Mariandale Retreat and Conference Center, LandVest, Scenic Hudson, the Town of Lewisboro and for individual landowners. He has also written stormwater management plans and wetland and conservation overlay regulations for municipalities and drafted conservation easements for land trusts. Jim was a contributing author to the Westchester County Climate Action Plan Report and Riverkeepers' 'Save It! Strategies for Achieving Smart Growth in the Hudson River Valley'. Jim holds a U.S. Fish & Wildlife license to possess raptors for educational purposes and earned his Masters in Environmental Management from the Yale School of Forestry and Environmental Studies in 2007.

General Recommendations--Plantings:

Plantings are chosen from existing local native vegetation based on sun/shade/wet/dry conditions with varying heights that will not interfere with golfing.

Sunny wetland and pond buffer plantings:

In water:	Blue flag
Water edge:	Buttonbush, speckled alder
Moist upperslope:	Winterberry, steeplebush
Drier upperslope:	Blueberry, alternate-leaf dogwood Choke cherry

Sunny edge of grass/meadow/fairways:

Bayberry, blueberry, cinquefoil,
meadowsweet
Bracken, hay-scented ferns

Sunny bare ground areas:

Low-bush blueberry, meadowsweet
Bearberry, partridgeberry
Virginia creeper

Shady bare ground areas:

Bunchberry, bracken, cinnamon,
interrupted ferns

Roadside:

Disease-resistant 'Patriot' or
'Liberty' elms

Diseased/dead trees:

Replace with native red spruce, red
oak

Specific Recommendations (see map on pg. 8):

1st hole:

Native flower and butterfly gardens, a recommendation of Audubon, can be planted at the eastern side of the clubhouse, where hostas and ferns now grow, and by the golf shop.

Plantings are selected based on height and can be arranged in the following order: at the back of garden, Joe-Pye weed and monarda (bee balm); in the middle of garden: coneflowers and black-eyed susan; at the front of garden: meadowsweet, orange milkweed and asters.

About a dozen white cedars and two large red oak trees provide a barrier between the fairway and the tennis courts. The eastern most tennis court is not sheltered by any trees. White cedars and red oaks could be planted between the fairway and the tennis court to provide a sun and wind screen and to deflect any errant drives.

2nd Hole:

The grassy ridge in front of the green is second cut, this grass can be allowed to grow up into taller grasses and kept in check with monthly mowing. Doing so will slow stormwater runoff, create some wildlife habitat, and help restore the course's original 'links course' appearance.

Along the left side of the fairway is a small, very wet patch of rough approximately 12' x 30'. Since this has standing water, it is not a playable area. This patch can be expanded

with plantings of steeplebush and goldenrod which will help in stormwater control while providing some wildlife habitat.

3rd Hole:

Three small to medium sized sugar maples grow between the men's tee and the road and should be maintained. Five non-native viburnums also grow here providing screening and shelter for wildlife. A non-native, European linden grows by the women's' tee. Since these nonnatives are not invasive and are not squeezing out other more desirable plants, it makes sense to spare the expense of removing them.

A long, narrow section of natural vegetation grows along the right side of the fairway by the road side. Asters, steeplebush, goldenrod, yarrow and Queen Anne's lace provide wildlife habitat, especially for foraging sparrows and other birds. This rough also prevents some errant golf balls from going into the street. The natural vegetations stops at the 150-foot marker where it becomes turf. Instead, this strip of natural vegetation could be carried all along the right side of the fairway to the 3rd green simply by mowing it less frequently, perhaps once annually, to prevent shrubs and trees from growing up.

Plantings along the right side of the fairway are limited because of the power lines. Now at least fourteen spruce have been topped to prevent them from growing into the power lines. Not only do these trees look unsightly, but they will probably not survive. One large elm tree has been allowed to grow around and then over the power line, but it is unlikely that other trees will be spared cutting in the future. A clump of medium height white birch grow across the street on the right side of the 2nd fairway. Planting clumps of white birch along the right side of the fairway might be a good alternative to planting larger trees that will eventually grow into the power lines.

The woods along the left side of the fairway are dominated by nonnative, invasive buckthorn and multiflora rose shrubs, Norway maples and bittersweet vines. This is the largest concentrations of invasive found on the golf course. These invasives are crowding out the mountain ash, elms and a grove of big-tooth and quacking aspen trees. Clearing the nonnatives would also expand the left side of the fairway playing area.

4th Hole:

Bittersweet vines are growing in the woods between the men's tee and the tool shed and should be clipped. One of the three large red oaks is marked for cutting, perhaps in an attempt to increase sunlight to the 3rd green. All three oaks appear to be healthy. An alternative to cutting these healthy, native trees would be to cut instead a few of the large, nonnative horse chestnut trees just to the south of the red oaks.

Along the left side of the fairway, nonnative, invasive buckthorn and euonymus (burning bush) shrubs could be removed by cutting the trunks and wiping with undiluted Roundup (glyphosate) to prevent resprouting. Four medium sized Norway maples are crowding out native red oaks. The Norway maples could be killed by girdling of the trunks.

The right side of the fairway is healthy, native woodland consisting of lots of red oaks, aspens, red spruce, red maples and a few white cedars.

The center fairway is very wet and has been mowed recently. This approximately one quarter acre can be allowed to grow up, mowed it a few times a season when conditions are dry enough. This area is uphill from the stream channel that runs from the 4th, 5th and 6th fairways. Water from this area drains directly into the channel. By letting natural vegetation grow, stormwater will be slowed and absorbed before it enters the channel which eventually exits the golf course at the 6th tee.

Several sightings of wildlife crossing here suggest that it is a wildlife corridor. By letting vegetation grow, the corridor will be more hospitable to wildlife, meeting a recommendation of Audubon to connect wildlife habitat areas to others inside and outside property boundaries with corridors of natural vegetation.

The birdhouse on the left side of the fairway should have a raccoon guard, either another piece of wood surrounding the entrance, or a piece of pvc on the pole. Raccoon guards should be placed on all birdhouses on the golf course.

5th Hole:

A patch of Japanese knotweed behind the championship tees should be removed by mowing.

The forest on the left side of the fairway is a red maple swamp. Associate trees are white ash, yellow birch, white birch and alder along with a few blueberry bushes. The few euonymus shrubs should be removed.

The woods on the right side of the fairway have many white birch, red maple, red spruce and aspen trees-typical of the mixed woods found in this region. Sensitive and cinnamon ferns grow along the edge. Care should be taken when cutting this rough to avoid the many smaller white birches growing here and on the neighboring property.

6th Hole:

At the 6th tee, three large, mature elms by road are scenic but will need to be replaced eventually. By planting small disease-resistant elms between them now, tall elms will remain even when the existing elms die or are taken down.

The rough between men's tees and ladies' tees is approximately one tenth of an acre and is valuable for wildlife habitat and stormwater absorption. The alders are excellent at absorbing nitrogen, which is contained in fertilizer that may runoff the nearby green. However, the alders need to be topped to prevent them from interfering with play. They are approximately four feet high now. The alders can be brush hogged (a large field mower attached to a tractor) now and every other year in the future to keep them from blocking play. Mowing the alders every other year will allow them to continue to absorb pollutants but will keep them from interfering with play.

The two black willows on the right side of the fairway are native and provide the first flowers in the springtime for early pollinating insects. Willows are also good at absorbing stormwater. To prevent them from interfering with play, the willow nearest the fairway should be pruned.

The stream channel that runs from the 5th fairway to the tees provides wildlife habitat and drainage. Natural vegetation only extends three feet on either side of the stream. Creating

taller, natural vegetation will aid in stormwater and pollution absorption. Creating additional vegetation can be as simple as allowing the grass to grow into a buffer, or, if resources permit, planting native herbs and shrubs. The buffer on the south side of the channel cannot be expanded without constricting the 5th fairway and green. The north side of the channel, however, can be expanded by approximately five feet to the golf cart. The channel section closer to the woods on the west side of the fairway can be expanded by approximately fifteen feet. This section has lots of standing water, tussock sedge in hummocks (raised mounds), path rush, bulrush, native beggarticks flowers with purple leaves, New York asters, white wood asters, brome grass, Canada goldenrod, yarrow, nonnative yellow irises and alder clumps. The presence of these plants indicate that this section is very wet for most of the year and not playable. Adding shrubs here will not interfere with play. Native blue irises (blue flag) can be added to or replace nonnative yellow irises. Beggarticks should be allowed to grow. Native shrubs such as winterberry and buttonbush, which thrive in wet and sunny conditions, can be planted alongside existing alders. These will not have to be topped because they will not grow to more six feet and will not interfere with play.

Along the right side of the fairway, the bluebird house has a tree swallow nest in it. Tree swallows are desirable because they are dramatic flyers and they eat insects. The box should be cleaned out in the late spring to remove the wasp nest. A second blue bird box can be added a few feet away to allow blue birds to nest. The tree swallows occupying the first box will not chase away the bluebirds, but, in the course of defending their territory, will chase away other tree swallows, allowing the bluebirds to nest.

The right side fairway rough, at the base of the hill, has invasive shrubs including Japanese knotweed (expanding from a large patch on the road), multi-flora rose, barberry and autumn olive. Brush hogging every two years will keep these nonnative, invasive shrubs in check and will maintain the varying heights that exist now. The low fairway grass transitions to higher herbs and shrubs which transition to higher alder, alternate-leaf dogwood, red maple, apple and choke cherry saplings. This type of habitat with varying heights and types of plants from ground cover to shrub and tree layers is desirable and meets a requirement of Audubon.

Near the top of the hill on the right side of the fairway are found young aspen, red oak and white birch trees. The invasive bittersweet and buckthorn shrubs should be brush hogged or cut, which will allow the native saplings to grow.

A native rose, probably swamp rose, is found here also in large numbers. It can be distinguished from the non-native multiflora rose by the size of the hips (fruit). The native rose has larger hips which are more desirable to wildlife. Where possible, multi flora rose should be brush hogged and the native rose should be allowed to grow.

The top of the hill has red spruce, black cherry and white birch trees, all native and desirable which should not be cut.

Along the left side of the fairway, a small patch of Japanese knotweed has made its way from across the fairway and road and should be brush hogged or mown. Care should be taken to avoid cutting the patch of native winterberry growing in the cleared woods at the base of the hill. If more clearing is desired to expand the playing area, a grove of about

thirty red maples could be cut. While native, red maples are abundant and can be invasive, crowding out other species.

Further up the hill on the left side, alders grow in thickets. These can also be removed if more playing area is desired. Like the red maples, alders are native but can also be invasive and since abundant numbers of alders are found elsewhere on the course, this would be a good area to clear by brush hogging the alders about fifteen feet into the woods to the point where the alders meet the black cherry trees.

Near the top of the hill on the left side, a large patch of two foot high raspberries can be removed to create more playing area. While native, raspberries can also be invasive. Raspberries can be cleared back about fifteen feet into the woods where two attractive white birches are found. The two medium sized red maples, approximately fifty feet tall, are candidates for clearing. The most cost effective way to remove these is by girdling the trunks with a saw completely around the trunk with a one inch cut. This will kill the red maples and since they are not tall and not near a public area, the risk of falling and causing damage is minimal.

7th Hole:

The pond on the left side of the 7th fairway has great potential for increased water storage-alleviating the need to draw down existing water supplies-and for expanded native plantings for wildlife habitat and stormwater control. Currently the grassy buffer is only three feet wide and should be expanded with native plants, particularly on the western edge which is out of play. The west side buffer can be expanded to the existing patch of vegetation that appears to be growing over a pipe running to a tank at the pond. Blue flag iris can be planted in the pond's water. Buttonbush and a few speckled alder can be planted at the water's edge. Winterberry and steplebush can be planted in the moist mid-slope, and blueberry, alternate-leaf dogwood and choke cherries can be planted on the drier upperslope. All of these native plants will do well in this sunny, wet area.

A line of four white pines along the left side of the fairway separating the driving range from the fairway looks unnatural and can be softened by interplanting with native red spruce and red oaks to add variety.

A historic sign, stone marker and bench commemorating Fort Gosselin, 1814, are found at the beginning of the dogleg on the right side of the fairway. The wooden bench can be repaired and this cleared area could be made part of the nature trail proposed for the woods north of the 7th fairway.

Much of the woods along the right fairway have been cleared recently to expand the playing area. Future clearing should focus on removing only nonnative trees. This will accomplish the goal of expanding the playing area while allowing native vegetation to grow. For instance, clearing at the dogleg in the future could be limited to removing the ten nonnative Norway maples, leaving the eight medium sized native white birches and a lone moosewood tree.

Piles of leaves and sod now left in the woods could be composted at the shed behind the 3rd green. Brush piles can be left in place for wildlife shelter.

Further up the right side of the fairway is another recently cleared area. This approximate half acre of healthy white cedars has been cleared, leaving white ash and a few Norway maples. In the future, the Norway maples should be killed by girdling and if more area is desired, the white ash should be cleared next as they are susceptible to at least two diseases, ash wilts and emerald ash borer, and will not live long. The fifteen or so yellow birches should also be left untouched along with any remaining white cedars.

At the right side of the 7th green is a partially obscured view of the Penobscot River. A huge, 100 year old white cedar has recently been cut here to open up the view. As mentioned above, in the future less desirable, nonnative trees should be cut and healthy, native trees should be left to grow, wherever possible. In this case, several small to medium sized Norway maples still block this impressive view, which can be seen from the 7th, 8th and 9th fairways. These Norway maples should be taken down or girdled. This scenic area could be an ideal place to start or end the proposed nature trail.

Behind the 7th green stand several Norway maples and many nonnative buckthorn shrubs. Removing the Norway maples may allow more sunlight and air to circulate on the 7th green. The four tall red spruce could then be left to grow.

8th Hole:

The woods to the left of the men's tee and fairway are made up of balsam firs, white cedars and red spruce, typical of the evergreen forests in the region.

The grassy ridge in front of the green can be allowed to grow up into taller grasses and kept in check with occasional mowing. Doing so will create some wildlife habitat, and will help restore the course's original 'links course' appearance.

At least four stumps have recently been cleared on both sides of the fairway. These bare areas would be ideal spots to replant young red spruce and/or red oak trees.

A large grove of about twenty-three red spruce grow behind and to the east of the 8th green. The two or three spruce nearest the green could be removed to prevent their roots from growing up through the green. The other spruce do not seem to present a problem since they do not block sunlight or prevent air circulation around the green because they are on the east side and the prevailing winds and sunlight come from the other side. One possibility would be to remove a line of spruce, creating a type of wind tunnel to increase air circulation if that seems to be a problem for fungus on the green.